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THE EPIDEMIOLOGY OF POLIOMYELITIS

By DON W. GUDAKUNST, M. D.

Medical Director of the National Foundation For Infantile Paralysis

Dr. Don W. Gudakunst, Medical Director of the National Foundation for Infantile Paralysis and formerly Commissioner of Health for the State of Michigan, recently addressed the Northern California Public Health Association upon the epidemiology of poliomyelitis. He emphasized the fact that infantile paralysis is not a newcomer, as far as world history is concerned, that it existed through the past several thousands of years unrecognized as a disease entity until one hundred years ago when Heine set it aside from other paralyzing conditions. All that is known about the disease has been learned in that hundred years and that knowledge has come mostly within the last several decades. In his informal discussion Dr. Gudakunst said:

"Advanced study in this disease is particularly difficult because it is due to a virus which, as you know, is an organism completely parasitic which can grow only within and at the expense of living cells. We can not do our laboratory and field studies with this disease with artificial culture media such as we can with other common bacterial diseases. Every time an examination has to be made in respect to this disease it calls for the sacrifice of a living animal and that animal must be a monkey and must be one of a few species of monkeys coming from Africa, India, Java. South American monkeys are not suitable. That produces tremendous problems of cost, tremendous technical difficulties that have slowed up advance and study of this disease.

This virus which causes infantile paralysis is a highly resistant agent. It is not easily destroyed. Tenacious of its ability to reproduce. It will remain infectious in a dried state. It is unaffected by exceedingly low temperature. In fact, they start at many, many degrees below zero. That is a method of preserving. It is not killed by such substances as glycerine or ether. They are used as preservatives in inhibiting the growth of other bacterial agents. It is not readily killed by sunlight. It is not killed by dosages of chlorine used in purification of water. I mention that because it has a very important bearing upon the epidemiological problem.

Another factor that has an important bearing is the method of elimination of this organism from the body. The "polio" virus is excreted with the stools. Every case of infantile paralysis can be demonstrated in a stool "polio" virus. That is not a practical method of making a diagnosis because of the time factor and expense of identification of these organisms but on diligent search and careful study we can say that practically 100 per cent of cases do eliminate the virus with the stool.

In a study of a small outbreak in New York State where there were but four or five cases of "polio" diagnosed, it was found that 50 per cent of the adults and 85 per cent of the childhood contacts also were infected with the "polio" virus and excreted the virus in their stools. In still another study, in Chicago, cases and contacts were studied over long periods of time. It was found that in at least a few of the cases a "polio" light virus was continuously recovered from the stools from periods as long as eight months. In other cases, very definitely "polio" virus was recovered over a period of four to eight weeks. There we have a very difficult and serious part of the problem: A highly resistant organism eliminated in the stools, not only of patients but of a high percentage of the contacts.

It can be stated that infection with this organism is an exceedingly common occurrence. "Polio" infection is a widespread condition. The virus certainly is disseminated over much of the territory.

Clinical cases, however, are not particularly numerous. We do not know how many cases of "polio" infection occur. It has been variously estimated that for each diagnosed case of infantile paralysis, there I use the term paralysis, there are from 10 to 1,000 undiagnosed.

We have a tremendous problem. Given a widespread, highly resistant organism, the pathway of entrance to the body becomes of paramount importance. We were taught a few years ago that this virus gained entrance to the body through the olfactory nerve and that was, if not the only, the principal way of such entrance. Without going into the details of pathological studies, I can say that that is not so. Infection by the olfactory root is at best an exceedingly uncommon method, at least in the fatal cases that come to autopsy. It is an easy way of infecting one type of monkey and a method adopted by many laboratory workers. Since they could infect that monkey it was assumed there was a superficial similarity between our children and this laboratory animal. That similarity may be important from some standpoints but not from the epidemiology of "polio". As a result of that thinking we had a wave of spraying things into the noses of lots of children. That's a very embarrassing procedure and a nonprofitable venture. It does not prevent infantile paralysis because that is not the method of the entrance of the virus into the body.

Now I emphasize the fallacy of drawing conclusions in respect to human behavior from animals. Yet I must fall back upon knowledge we have gained from animals. Using the experimental animal, we find that infection can be produced by any means which allows this virus to enter the body and gain contact with nerve tissue. In animals which are more susceptible than certain types of monkeys, we find we can produce infection by feeding the virus. In susceptible animals, also, the infection can be produced by inhalation. Routinely now, in many laboratories, infection is produced by intradermal and subcutaneous inoculations of minute amounts of virus. Dipping the end of a nerve in virus suspension also produces the disease. All of those ways produce the clinical disease in the susceptible animal. It would seem reasonable that we could assume that the same thing holds true in humans, although it has not been definitely proven; namely, that infection can be produced by any means that allows this virus to enter the body. What the common method is in nature, we do not know. Many argue that, since the virus is found routinely in the intestinal content, the commonest method of infection is by the intestinal route. That may or may not be sound reasoning. There is every possibility that mosquitoes can play a role as vector. That has not been proven. In the laboratory, however, mosquitoes have been infected by feeding upon animals with experimental "polio" and such infection has, by artificial means, been passed on from those mosquitoes to new animals. That train of events, however, has never been demonstrated in humans.

We do know that flies of various kinds harbor the virus within or upon their bodies. Many workers have trapped flies in epidemic areas and have demonstrated that these flies carry the virus. It is very easy to imagine that these flies contaminate our food and we have spread the infection that way. It is also easy to imagine that some of the blood sucking flies may pass on infection by that means. However, again I wish to emphasize that that train of events has never been demonstrated in a human and we do not know whether it ever occurs. Just plainly, we don't know how this virus is spread from one person to another. We know that it must be but we have never been able to trace its course. Lacking that information, we are in a position of having our hands rather tightly tied when we have tried to introduce any barriers that will check the spread. We do know what can be done in stopping an epidemic. We don't know how to do it.

Now, another complicating factor in this disease is the problem of immunity. Immunities of all ages are relative but it does seem that in "polio" there is comparatively little immunity to the organism's body as a whole conferred by having one attack of the disease. Again going back to the experimental animal. One infection, once having been produced, does not produce an immunity in that animal. That same thing holds true in humans. We have thought that the individual child or a person who had "polio" was not apt to have a second infection. He is not, but that's purely a statistical problem. The incidence of paralyzing "polio" is not high. You can figure it out for yourselves. Maximum outbreaks today will not have many more than eight or ten thousand cases in the whole of the United States. Allow that attack rate on the basis of 135,000,000 people to that 8,000 and see how long you have to go before you have one of them coming down with a second attack of the disease. Taking into consideration your age groups, the chances of any one physician seeing a return of any one case is very, very remote. Wide surveys of old cases made for the purpose of determining what bodily changes had taken place in the interim between dismissal and the period of reexamination shows quite definitely that repeated infections are almost as common in the "polio" patients as are primary infections in the population at large with adjustments in age grouping. Such immunity as does exist is undoubtedly cellular. That is, it is not numeral. The immunities do not lie within the fluids of the body. It is the individual cell that has had some attack by this organism and recovered that has this immunity. If an animal has been infected through the internasal route with the olfactory nerve acting as passage way, it is easier to reinfect this animal by injecting virus into a nerve trunk, etc., than it is to infect him by the same olfactory route. It is important to point out that the measuring of neutralizing antibodies in the blood stream of any individual in no way measures the immunity of that individual. The presence of neutralizing antibodies in the blood stream denotes possibly another infection, a previous infection. It does not preclude the possibility of a subsequent infection. The importance of that can not be overstressed in certain therapeutic practices. If an individual doesn't protect himself by his

own blood stream content, one wonders what happens if you take a few cubic centimeters of his own blood and put it into somebody else.

Let me briefly mention incidence of this disease. "Polio" was not recognized in the United States until about 1894 when there were a few scattered cases. The great outbreak occurring in the East, some 27,000 cases in one year, was the peak. Since then, the disease has been disseminated over the whole country so that every year every State in the Union reports some cases of paralytic "polio" and whole country so that every year every State in the United States, about 25 or more cases are reported. This is a year-round disease and it is a nation-wide disease, exacerbations occurring during the summer and early fall. Why those increases in incidence occur during that period we do not know. Nothing ties in together. It can not be solely an insect-borne disease, it can not be solely this or that, because for every theory advanced you can knock down and show we don't have any flies in December and January in North Dakota. We don't have mosquitoes at that time of year, yet we have "polio." It just happens that way."

EDUCATIONAL QUALIFICATIONS FOR HEALTH EDUCATORS*

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I. *Health Education's Part in Winning the War*

The public health profession of America has never faced a greater challenge than today. Any war brings public health problems of enormous variety and magnitude. War, famine, pestilence and death are still inseparable companions. But this war far exceeds all others in its public health implications. This is a war of production. Over and above the need for valiant fighting men, is the need for supplying those men with the engines of war. In no other war down through the centuries has the fighting man needed so much and such complicated equipment. Never before has the cost of killing the enemy been so great. Never before has it taken so many workers in the factories and fields at home to keep one fighter supplied at the front. The working efficiency of the production force at home must not be impaired by preventable illness, by low morale due to bad health, or by lack of skill due to poor training and maladjustment. Otherwise, this war could be lost on the home front.

Wars are not won conclusively by conquering armies or by invading homelands. They are won finally by destroying the will of the conquered peoples to fight back. No better implements for this purpose exist than malnutrition, tuberculosis, the ravages of epidemic disease.

Military leaders have learned to their sorrow that nothing shatters the morale of the fighting forces more than worry over the loved ones at home. Concern over the health of families impairs fighting efficiency and even leads to desertion.

This is a large order under existing circumstances. It is an order, the filling of which, will require more health education than ever before.

The past quarter century has taught us that health can not be safeguarded solely by legislation. Water purification, sewage disposal, food sanitation and even quarantine have done much to improve individual health, but they alone will not control diphtheria, tuberculosis and smallpox. Legislation alone will never, in a democracy, remedy malnutrition, make the periodic health examination a universal practice, or bring about adequate financial and moral support of health departments. All legislation to be effective must depend upon education. New scientific discoveries for safeguarding health are often largely dependent on education if their value depends on utilization by the public. The best of sanitary legislation, the development of new and effective scientific discoveries will all be less effective in the absence of public enlightenment concerning them.

Since the objective of health education is to improve health behavior, and since so much preventable illness and premature death in this country today is a result of improper health behavior and incorrect health attitudes, this group of health educators shares as largely as any other branch of the public health profession, the heavy responsibilities of helping to win the war on the home front.

This institute therefore becomes of greater importance than any of the preceding ones. Our responsibilities are graver and heavier than ever before. We are met to prevent in this Nation, if we can, some of the underlying causes of defeat in any nation; to remedy so far as we can, some of the reasons for defective health behavior in this Nation; and to solve, so far as is within the power of our most earnest efforts, some of the problems confronting all health educators.

II. *Confusions in Health Education*

One of the greatest of these problems has been the confusion which exists with respect to the values and techniques of modern education when applied to the field of public health. Stemming as it does from the engineering, medical and related professions, public health has been slow to fully appreciate the potential contributions of education. Education too has been slow in developing health teaching methods and accepting the importance of health teaching as one of its primary objectives. Between the two professions of public health and education has been the barrier of differ-

* Presented at Ninth Institute on Health Education, American Public Health Association, St. Louis, Mo., Oct. 24-27, 1942.

ing professional "lingo." This barrier has at times assumed the characteristics of an insulated double brick wall. But a few hardy souls in each profession have had the courage and patience to run around the barrier, listening and asking questions of the other group and returning to their own group with gems of wisdom interpreted in their own language. Soon the curiosity of each group was aroused and we now find educators being invited to advise with public health officials and health officers being invited to advise with educators. It would seem that this age-old barrier is about to be breached. It is meetings such as this institute which will widen that breach to the end that eventually all may unite as staunch allies in the battle for preservation of the Nation's health.

One of the most significant steps towards clearing confusion in the field of public health education is the emergence of a report from the Committee on Professional Education on the educational qualifications of health educators. This is a new report supplementing the one approved distinguished group representing two preceding committees, one on professional qualifications of adult health educators and one on school health educators. Under the chairmanship of Professor C. E. Turner and the refereeship of Doctor John Wundwall, this committee has admirably summarized the work now being done by health educators in health departments, schools and voluntary health agencies. They have described clearly and briefly the values of health education both in schools and health agencies. Most important of all, perhaps, they have concluded that health educators, whether employed by schools or health departments or both, are essentially educators and need full training in both education and public health. Finally, they have listed the academic training which seems most desirable for professional preparation in this important field.

Meanwhile, the professionalization of health education has already advanced immeasurably through this report. It distinguishes between health education, information and propaganda. It defines the proper place of publicity in health education. It shows the health officer how he may use the skilled health educator to the best advantage. Already, in its preliminary form it has formed the basis of a merit system examination for some state departments of health.

In conclusion and summary, health educators must play an important part in winning the war. This is a cause even greater than we have faced before. It permits no trifling. Confusion as to the status, functions and training of health educators is being reduced by an increasing rapport between the two great professions of education and public health. A great advance will be made when educators and public health authorities can agree on the functions, responsibilities, values and training of those professional people who wish to devote themselves to the field of health education.

LABOR UNIONS ENDORSE BLOOD TEST PROGRAM

The Executive Board of the California State Federation of Labor at its meeting held in Los Angeles June 12th, recommended that member unions require each applicant for membership to have a blood test made before admission into the union. The results of such tests are to be a matter of strict confidence between the examining physician and the applicant. The results, under no circumstances, are to be revealed to the union nor to the employer and will have no bearing upon the applicant's admission into the union. So far as is known, this is the first time that union labor has taken this sort of action anywhere in the United States.

PREMARITAL AND PRENATAL TESTS

During May 17,330 premarital blood tests for syphilis were made in laboratories throughout the State. Of these, 333, or 1.97 per cent, were positive. During the same period 15,605 prenatal blood tests were done in laboratories scattered throughout the State. Of these, 283, or 1.81 per cent, proved positive. These both represent increased percentages over those that have prevailed since the premarital and prenatal blood test laws went into effect in 1939. Since the beginning of the operation of these laws 1.60 per cent of the premarital blood tests have proved positive and 1.54 per cent of the prenatal blood tests have proved positive. It is presumed that the increase in positive blood tests reported during recent months is due, largely, to the increased negro population in California since it has been shown that from 15 per cent to 35 per cent of negro selectees are infected.

STATE'S BIRTH-RATE IS HIGH

Last year brought the largest number of births to California of any year in its history. Provisional figures indicate that there were 152,586 births registered within the State last year. During the past five years, almost 600,000 births have occurred in California. The high birth rate, together with the unprecedented influx to California of war industrial workers, are factors of great magnitude in developing the State's population. Following are the number of births that have occurred annually in California during the past five years:

	1938	*1939*	*1940*	*1941*	*1942*
Births in California	101,617	103,656	111,840	125,052	152,586

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Santa Maria—Under County Supervision

SANTA CLARA COUNTY—San Jose—
C. M. Burchfiel, M.D.
Alviso—Albert R. Currlin, M.D.
Gilroy—Under County Supervision
Los Gatos—Under County Supervision
Morgan Hill—R. L. Newbold, M.D.
Mountain View—Under County Supervision
Palo Alto—Mr. Louis Olsen
San Jose—Dwight M. Bissell, M. D.
Santa Clara—Under County Supervision
Sunnyvale—Under County Supervision
Willow Glen—Under County Supervision

SANTA CRUZ COUNTY—Santa Cruz	John D. Fuller, M.D.
Santa Cruz	John D. Fuller, M.D.
Watsonville	D. S. Woodard, M.D.
SHASTA COUNTY—Redding	B. F. Saylor, M.D.
Redding	Mr. R. A. Saeltzer
SIERRA COUNTY—Downieville	Carl C. Sutton, M.D.
Downieville	Under County Supervision
Loyalton	Mr. Clyde Spradling
SISKIYOU COUNTY—Yreka	Albert H. Newton, M.D.
Dorris	Albert B. Gray, M.D.
Dunsmuir	Mr. V. M. Wickes
Etna	Hubert C. Eller, D.D.S.
Fort Jones	Jacob K. Gibbel, M.D.
Mount Shasta	James B. McGuire, M.D.
Yreka	Chas. Pius, M.D.
SOLANO COUNTY—Vallejo	Lester S. McLean, M.D.
Benicia	Lewis H. Sanborn, M.D.
Dixon	Mr. H. C. Grove
Fairfield	Felix R. Rossi, M.D.
Rio Vista	Mr. Floyd N. Holmes
Suisun	Mr. A. C. Tillman
Vacaville	Mr. O. E. Alley
Vallejo	Lester S. McLean, M.D.
SONOMA COUNTY—Santa Rosa	E. D. Barnett, M.D.
Petaluma	N. B. Rundall, D.O.
Cloverdale	Frank E. Sohler, Jr., M.D.
Healdsburg	D. C. Oakleaf, M.D.
Santa Rosa	Mr. E. J. Helgren
Sebastopol	Chester Marsh, M.D.
Sonoma	Mr. Ted Reis
STANISLAUS COUNTY—Modesto	J. Lyle Spelmann, M.D.
Ceres	Under County Supervision
Modesto	Under County Supervision
Newman	J. E. Thompson, M.D.
Oakdale	Under County Supervision
Patterson	Mr. C. Busengdal
Riverbank	Under County Supervision
Turlock	A. J. Ronsse, D.V.M.
SUTTER COUNTY—Marysville	J. Russell Frantz, M.D.
Yuba City	Under Bicounty Supervision
TEHAMA COUNTY—Red Bluff	Donald Thompson, M.D.
Corning	Arthur H. Meuser, M.D.
Tehama	F. L. Doane, M.D.
Red Bluff	James L. Faulkner, M.D.
TRINITY COUNTY—Weaverville	David D. Thornton, M.D.
TULARE COUNTY—Visalia	J. C. Malcolm, M.D.
Dinuba	Lewis L. Seligman, M.D.
Exeter	W. L. Nichols, D.O.
Lindsay	Wm. P. Bowen, M.D.
Porterville	Frank L. Wiens, M.D.
Tulare	William T. Burton, M.D.
Visalia	Charles S. Ambrose, M.D.
Woodlake	Under County Supervision
TUOLUMNE COUNTY—Sonora	H. D. Rose, M.D.
Sonora	H. H. McGillis, M.D.
VENTURA COUNTY—Ventura	Frank E. Gallison, M.D.
Fillmore	Under County Supervision
Ojai	Under County Supervision
Oxnard	Under County Supervision
Santa Paula	Under County Supervision
Ventura	Under County Supervision
YOLO COUNTY—Woodland	John G. O'Hara, M.D.
Davis	Under County Supervision
Winters	Under County Supervision
Woodland	Under County Supervision
YUBA COUNTY—Marysville	J. Russell Frantz, M.D.
Marysville	Under Bicounty Supervision
Wheatland	Under Bicounty Supervision

INFANTILE PARALYSIS MORE PREVALENT

During June, 258 cases of infantile paralysis were reported in California. During the first two weeks of July, 115 cases of the disease were reported. During the first six months of the present year, 394 cases occurred, which is considerably higher than the usual number of cases reported during the first half of any year, with the exception of 1934, when, from January to June inclusive, 1,615 cases were reported. That year brought the most extensive epidemic of the disease that has ever occurred in California, 3,396 cases having been reported during the year.

The present situation throughout the State is worthy of attention but is not alarming. The most important measure to be adopted at the present time, lies in the provision of the Kenny hot-pack method of treatment. This treatment should be applied before there has been any sign of muscular weakness or crippling. Children who show any signs of illness should be sent to bed immediately and a doctor called if the illness persists.

No new factors in preventing the spread of the disease have been developed. It has been shown that the closing of theaters, churches and schools is of no value in the prevention of the spread of the disease. It is recommended, therefore, that all such places be kept open. Similarly, the closing of swimming pools is not recommended, if they are properly supervised. Unnecessary travel, particularly in busses and trains, which are extremely crowded during the transportation emergency, should be avoided. In summer camps where the disease is not prevalent, there is probably less danger of contracting infantile paralysis than in a crowded city where the disease may be prevalent. It is essential, however, that all camps be provided with medical supervision, or, at least, that medical care be readily available. Children should not be allowed to become overtired. Long hours of sleep and rest, with plenty of nourishing food, should be provided. It is advisable to keep children away from crowds and strangers as much as possible. Unless of an emergency nature, surgery of nose and throat should be postponed to a later time.

SEROLOGICAL WORK INCREASES

More than 62,000 serological tests, mainly for syphilis, were performed in the State Laboratory during May. Of these, 7,523 were Wassermann, 6,691 Kahn and 48,183 Kline tests. A total of 36,863 tests was performed for Selective Service. Of these, 2,939, or 8.1 per cent, were reported positive. This does not present a true picture of the per cent of syphilis in selectees because, in positive cases, repeat tests are frequent.

POLIOMYELITIS CASES REPORTED JANUARY-JULY, 1943

County*	January–May	June				July					Total
		Week ending				Week ending					
		6/4	6/11	6/18	6/25	7/2	7/9	7/16	7/23	7/30	
Alameda	7	1	1	1	4	8	4	7	16	12	61
Amador								1			1
Butte									2		2
Calaveras								6	10	9	25
Contra Costa	2		3	7	1	4	23	8	5	10	63
Fresno	3	3	1	4	3		5	5	2	2	28
Glenn					1						1
Imperial					2						2
Kern	3	17		5	12		3	18	4	46	108
Kings						1					1
Lake							1				1
Lassen				1					1		2
Los Angeles	64	8	14	16	18	17	28	9	29	28	231
Madera	1	1							1		3
Marin	1			1		1	1		4		8
Mendocino									6	4	10
Merced				1							1
Monterey								1	1		2
Napa	1						1				2
Nevada	1										1
Orange	13	1	4		1			1	1	1	22
Placer								2			2
Riverside				1	2						3
Sacramento	1				10	7	2	5	2	2	29
San Benito									1		1
San Bernardino	5	2	1	1		1	2		1		13
San Diego	8			1			1		3	4	17
San Francisco	7	1		1	2	3	4	5	4	1	28
San Joaquin	2	1		1			1	1	4	2	12
San Luis Obispo	2						1	2		1	6
San Mateo	2			1	1	1	2	1	1	3	12
Santa Barbara	1				1		1	2			5
Santa Clara	5		1			4	5	5	10	6	36
Santa Cruz	3									6	9
Shasta	1						1		1		3
Solano	1		2	5	1	5	2	3	1	3	23
Sonoma				1	1	15	13	11	3	3	47
Stanislaus				1			2	1	3	5	12
Sutter				1		1			1		3
Tehama	1							2	1		4
Tulare				2		3	1	5	3	1	15
Ventura	1					1					2
Yolo					1	1					2
Yuba				4	1	1					6
From Oregon							1				1
Totals	136	35	27	56	62	74	105	101	121	149	866

*Only those counties reporting cases have been listed.

TABLE NO. 2

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1927	11	8	7	9	22	77	218	323	251	157	141	74	1,298
1930	16	3	12	17	64	224	482	246	261	360	145	73	1,903
1934	25	27	18	38	314	1,193	767	430	225	182	103	74	3,396
1943	27	16	18	23	52	258	477						?
Nine year median 1934-1942	16	11	9	12	17	36	75	64	97	69	47	29	

TABLE NO. 3

Age Groups	1943*		23 Years 1920–1942	
	Cases	Per cent	Cases	Per cent
Under 1 year	7	.97	332	2.6
1— 4	156	22.70	2,861	22.0
5— 9	215	29.90	3,611	27.8
10—14	157	21.84	2,417	18.6
15—19	76	10.57	1,303	10.0
20—24	32	15.02	882	19.0
25—34	46		1,059	
35—+	30		531	
Unknown	2		169	
Total	721	100.0	13,165	100.0

*First 721 cases reported.

BEACH QUARANTINE

Last month the department inaugurated a quarantine of Santa Monica beaches on an area 10 miles long. This is probably the most extensive quarantine of its kind that has ever been attempted. The reason for the action lies in sewage pollution of the ocean shore. The quarantine which involved the placarding of the beaches at approximately 500-foot intervals is being observed.

MORBIDITY REPORT—JULY, 1943

Reportable diseases	Week ending				Total cases	5 yr. median	Total cases
	7/10	7/17	7/24	7/31	July	July	Jan.–July inc.
Amebiasis (Amoebic Dysentery)	3	3	1	3	10		60
Anthrax							
Botulism							3
Chancroid	1	1	4	2	8		115
Chickenpox (Varicella)	300	772	219	193	1,484	678	39,142
Cholera, Asiatic							
Coccidioidal granuloma				1	1		11
Conjunctivitis—acute infectious of the newborn (Ophthalmia Neonatorum)	1	1		3	5		26
Dengue							1
Diphtheria	11	21	11	8	51	78	607
Dysentery, bacillary	2	15	21	11	49		251
Encephalitis, infectious	3	11	4	18	36		59
Epidemic diarrhea of the newborn	5	17	3	9	34		116
Epilepsy	29	37	27	39	132		1,089
Food poisoning		1		44	45		420
German measles (Rubella)	136	219	99	88	542		28,345
Glanders							
Gonococcus infection	259	338	219	310	1,126	1,280	7,554
Granuloma inguinale	1		1		2		15
Influenza, epidemic	13	24	17	17	71	56	1,290
Jaundice, infectious		3	1	2	6		83
Leprosy							4
Lymphogranuloma venereum (lymphopathia venereum, lymphogranuloma inguinale)	2	8	3	6	19		89
Malaria	5	2	2	5	14	21	79
Measles (Rubeola)	355	417	280	191	1,243	1,394	19,199
Meningitis, meningococcic	20	11	15	7	53	6	635
Mumps (Parotitis)	349	727	211	184	1,471	703	19,447
Paratyphoid fever, A and B		1	1	1	3		30
Plague							
Pneumonia, infectious	55	60	35	55	205	181	2,831
Poliomyelitis, acute anterior	105	101	121	149	476	27	866
Psittacosis							
Rabies, human							1
Rabies, animal	11	17	18	10	56	46	464
Relapsing fever							2
Rheumatic fever	3	3	4	8	18		208
Rocky Mountain spotted fever			1		1		4
Scarlet fever	85	84	90	62	321	250	4,309
Septic sore throat, epidemic							
Smallpox (variola)						3	4
Syphilis	682	763	391	727	2,563	1,794	18,475
Tetanus	1	2	1		4		33
Trachoma	1	2			3		103
Trichinosis	2				2		11
Tuberculosis, pulmonary	158	176	249	199	782	674	4,707
Tuberculosis, other forms	12	9	11	14	46	50	265
Tularemia	1				1		6
Typhoid fever	3	3	3	1	10	32	64
Typhus fever			1	1	2		14
Undulant fever (Brucellosis)	3	5	4	2	14	26	104
Whooping cough (Pertussis)	221	384	246	245	1,096	1,059	11,581
Yellow fever							
Total							162,722

Note—A summary of morbidity for the preceding month will appear in each mid-monthly issue of CALIFORNIA'S HEALTH.

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